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Honors Thesis

EXERCISE DEPENDENCE AND EATING DISORDERS AMONG COLLEGE STUDENTS

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Abstract

Background: Excessive exercise can become an addiction known as exercise dependence (ED).

Findings: We used the Exercise Dependency Scale Test (EDS-21) and the Eating Attitudes Test (EAT-26) to assess the prevalence of ED and eating disorders. We discovered that out of 520 participants, 3.3% could be characterized as at-risk for ED, 51.5% as nondependent-symptomatic, and 45.2% as nondependent-asymptomatic. The prevalence of being at-risk for eating disorders was approximately 8%.

Conclusions: It seems that the prevalence of ED and eating disorders at Andrews University is similar to the general population.

Keywords: Exercise dependence, Eating disorder

Background

Excessive exercise can become an addiction known as exercise dependence (ED). ED occurs when the person is preoccupied with exercise, has withdrawal symptoms upon cessation, continues to exercise when socially or medically contraindicated, and when exercise interferes with relationships and work [1-6].

Studies have been conducted on the prevalence of ED and eating disorders. However, there is debate on the methodologies, diagnosis cut off points, and the relationship between the two [2, 7-10]. Although eating disorders are recognized by the American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Health Disorders (DSM-IV), ED as a disorder on its own has not been officially categorized. There are two proposed types of ED: primary and secondary. Primary dependence occurs when the person is preoccupied with exercise, has significant withdrawal symptoms upon cessation, experiences distress or impairment in their functioning, and it is not accounted for by another mental disorder. Secondary ED occurs as a complication of an eating disorder. Secondary ED as a complication of an eating disorder has been documented, whereas the existence of primary exercise dependence is debatable [2]. Research indicates that people who are at high risk for developing ED are high-performing athletes, young women, former athletes, high achievers, and those with body image issues or addictive personalities [11].

The goal of this cross-sectional study was to (i) study the prevalence of ED among college students and (ii) to investigate the relationship between eating disorders and ED.

Methods

Participants

With the approval of the University's Institutional Review Board, students in various undergraduate and graduate classes on the campus of Andrews University were asked to complete a self-reported, anonymous, paper questionnaire. The questionnaire was composed of four sections: 14 demographic and exercise behavior (EB) questions, a 31-item Food Frequency Questionnaire (FFQ), the Exercise Dependency Scale Test (EDS-21), and the Eating Attitudes Test (EAT-26). There were 567 participants, who completed the survey; 47 subjects were disqualified because they were not between ages 18 to 25, leaving a study population of 520 (mean age 19.7 ± 1.6 ; 44% males, 56 % females), representing a wide range of ethnic backgrounds (37% Caucasian, 22% Black, 12% Oriental, 12% Hispanic and 17% mixed ethnicity) and dietary preferences (63% omnivore, 28% lacto-ovo-vegetarian, 6% pesco-vegetarian and 3% vegan). Andrews University is a Seventh-day Adventist (SDA) institution of higher learning. SDAs represent a unique population for their wide range of dietary habits. This religious group endorses a healthy lifestyle and recommends that members adhere to a lacto-ovo-vegetarian diet.

Measures

The EDS-21 is based on the DSM-IV criteria for substance dependence. It provides following information: mean overall score of exercise dependence symptoms, and it differentiates between: (a) at-risk for exercise dependence, (b) nondependent-symptomatic, and (c) nondependent-asymptomatic. The items on the test are based on the following criteria: tolerance, withdrawal, intention effect, lack of control, time, reductions in

other activities, and continuance. The test involves 21 items on a Likert scale ranging from 1 (never) to 6 (always). The test has acceptable test-retest and internal consistency reliability, content and concurrent validity [12-13].

The Eating Attitudes Test (EAT-26) consists of 26 questions on the 6-point Likert scale ranging from 1 (always) to 6 (never). It is useful and valid for determining the prevalence of an eating disorder but not diagnosing the specific disorder. A score of greater than or equal to 20 is considered "at-risk" for an eating disorder. The EAT-26 has been validated and can be regarded as reliable and valid instrument for screening for eating disorders [7, 14].

EB was ascertained using four questions about the usual exercise habits of the participants. The questionnaire measured the frequency that individual engages in aerobic, strength and flexibility exercises and the type of aerobic activities done most frequently. Each score was then converted in to metabolic equivalents (METs) (aerobic exercise x 7, strength training x 6, and flexibility exercise x 2.5) and summed up to provide the total energy expenditure in METs/week [15].

The FFQ was used to accurately ascertain the vegetarian status of the participants. Previous studies have documented that self-defined vegetarian status can be an unreliable indicator of true dietary preferences [16]. The instrument is valid and was used in previous studies [17].

Statistical Analysis

The data was analyzed using SPSS (version 18.0; SPSS, Inc., Chicago, IL, USA) using ANOVA, χ^2 tests and Pearson Correlations. Two-sided P values less than or equal to 0.05 were considered statistically significant.

Results

In our population, 3.3% of students could be characterized as at-risk for ED, 51.5% as nondependent-symptomatic, and 45.2% as nondependent-asymptomatic. The prevalence of

Table 1. Characteristics of participants by their ED status

| | At-risk (n= 17) | Nondependent- symptomatic (n=268) | Nondependent- asymptomatic (n=235) |
|--|--------------------|---|--|
| Age: years (mean±SD) | 19.7±1.5 | 19.7±1.6 | 19.7±1.6 |
| Aerobic exercise: hours/week (mean±SD) * | 6.1±5.1 | 3.9±3.2 | 2.3±2.5 |
| Strength training: hours/week (mean±SD) * | 5.9±4.4 | 2.8±2.6 | 1.0±1.5 |
| Flexibility exercise: hours/week (mean±SD) * | 2.2±2.6 | 1.6±2.8 | 0.9±1.5 |
| Energy expenditure: METS/week (mean±SD) * | 84.1±51.6 | 49.0±35.9 | 25.2±24.0 |
| EAT-score (mean±SD) * | 14.4±10.3 | 8.6±7.6 | 6.9±6.1 |
| EDS-21 score (mean±SD) * | 94.8±11.6 | 57.6±11.4 | 32.0±7.6 |

* Signifies significant trend across variable categories at $p<0.05$, EAT-score of 20 or higher indicates at-risk for eating disorder

at-risk for an eating disorder was 8%. Our study confirms results reported in other studies with similar rates [11, 18]. Table 1 shows selected characteristics of the participants by their

Table 2. Characteristics of the participants at-risk for ED

| | Males (n=10) | Females (n=7) |
|--|-----------------|------------------|
| Ethnicity % (n) | | |
| Caucasian | 40 (4) | |
| Hispanic | 30 (3) | 43 (3) |
| Black | 20 (2) | 14 (1) |
| Mixed ethnicity | | 43 (3) |
| Oriental | 10 (1) | |
| Vegetarian status % (n) | | |
| Omnivore | 60 (6) | 57 (4) |
| Vegetarian | 4 (40) | 43 (3) |
| At-risk for eating disorder % (n) | | |
| At-risk | 30 (3) | 14 (1) |
| Not at-risk | 70 (7) | 86 (6) |

ED status. Participants at-risk

for ED spend significantly

more time and energy weekly

exercising; they also scored

higher on EAT-26 and EDS-21

scores ($p<0.001$). Table 2

presents characteristics of

participants at-risk for ED.

The majority of males at-risk

for ED were Caucasian and Hispanics, omnivores, and not at-risk for developing an eating

disorder. The majority of females at risk for ED were Hispanic or of mixed ethnicity, omnivores, and not at-risk for developing an eating disorder. The most popular sports among those at-risk for ED were running and walking.

We computed correlations to determine the relationships between ED, eating disorders and exercise behavior for males and females. In males EB ($M=45.3\pm36.9$) was significantly correlated with ED ($M=50.1\pm18.9$, $r=0.466$, $p<0.001$); followed by the ED and eating disorders scores ($M=6.6\pm6.3$) being significantly correlated ($r=0.234$, $p<0.001$); and EB being significantly correlated with eating disorders ($r=0.151$, $p=0.023$). In females EB ($M=35.1\pm32.3$) was significantly correlated with ED ($M=45.3\pm17.3$, $r=0.451$, $p<0.001$); followed by the ED and eating disorders scores ($M=9.1\pm7.8$) being significantly correlated ($r=0.264$, $p<0.001$); however EB did not correlate with eating disorders ($r=0.041$, $p=0.485$).

Discussion

The purpose of our study was to study the prevalence of ED among college students, to investigate the relationship between eating disorders and ED and to replicate previous research [8]. In our population, 3.3% of students could be characterized as at-risk for ED, confirming results reported in other studies with similar rates (1-4%) in the general population [11]. Vegetarian status was not related to ED or eating pathology in either males or females. The majority of those at-risk for ED were runners or walkers, which is not surprising considering the addictive nature of running and its history as a positive addiction [5]. The majority of those at-risk for ED were Hispanics, followed by Caucasians. Perhaps this can be attributed to the self-image differences between ethnic groups such as Hispanics and

Caucasians compared to Blacks and Asians. In our population, the prevalence of at-risk for an eating disorder was 8%, however only 23% of the individuals at-risk for ED were also considered at-risk for an eating disorder. Previous research reported that ED mediates the relationship between EB and eating pathology [8]. Using methodology outlined by Baron and Kenny [19] we were not able to confirm this mediating relationship for females but for males only.

Several potential limitations to this study should be considered. This is a population based cross-sectional study, which included both genders and college students ages 18 to 25. The study was conducted on a campus of an American private university which may limit the generalizability of the results. For the measurement of EB we have used a simple, not validated exercise questionnaire. Strengths of the study include a relatively large sample size and the use of the validated EDS-21 and EAT-26 questionnaires.

In conclusion, the prevalence of ED and eating pathology at AU seem to be similar to the rates seen in general population. In our population ED seems to be a mediator between EB and eating pathology for males only. Replication of our results in similar populations are necessary.

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